Instruction Manual Version 5 11.09

SX-8G IP-Star

Automated System for ChIP, MeDIP & MBD

SX-8G IP-Star a ground-breaking robotic system designed to increase your lab's productivity, efficiency and experimental reproducibility. For ChIP and MeDIP assays, IP-Star is capable of processing up to 16 samples per cycle. The robot processes sheared chromatin (or DNA) to deliver purified DNA ready for qPCR, amplification, microarray or sequencing (e.g. Solexa™) analysis. IP-Star has an easy-to-use open software that provides you with flexibility. This allows you to create your personal protocol according to your specific needs.

diagenode

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Content

Introduction 4
- Intended use of SX-8G IP-Star 4

General information 5
- Description 5
- External Features 5
- Internal Features 7
- Installation Procedures 8
- Requirements 8

SX-8G IP-Star Content and Consumables 10

Safety information 12
- Proper use 12
- Electrical safety 12
- Biological safety 13
- Chemicals 14
- Waste disposal 14
- Mechanical hazard 14
- Heat hazard 14
- Symbols on the SX-8G IP-Star 15
- Warranty statement 15
- Liability clause 15

Preventive Maintenance 16
- Daily Maintenance Procedure 16
- Weekly Maintenance Procedure 17
- Monthly Maintenance Procedure 19

Technical assistance 20

SX-8G IP-Star Software 21
- Start and close SX-8G V52 21
- Initial Window 21
- Menu Bar 22
- Tool Bar 24
- Protocol Name 24
- Stage Layout and Module Names 25
- Setting of Disposables 26

Troubleshooting 27

Ordering information 28

Related products 30

Introduction

Thank you for choosing the DIAGENODE SX-8G IP-Star molecular biology workstation. We are sure that you will enjoy using it and that it will bring a lot of satisfactions.
Before using the instrument, it is important to read this manual attentively and to pay particular attention to any advice concerning hazards that may arise from a inappropriate use of this instrument.

Note: Do not unpack or install the device by your own. Unpacking, installation and training on site will exclusively carried out by DIAGENODE !

Intended use of the SX-8G IP-Star

The SX-8G IP-Star is a desktop robotic system designed to perform fully automated Immunoprecipitation using magnetic particles. Starting with sheared chromatin or DNA and ending up with purified DNA ready for further analysis. The SX-8G IP-Star is intended as a microtiter diluting and dispensing device. A nozzle moves in directions of X, Y and Z-axis to dispense reagents, to homogenize during incubation times and to perform magnetic separation. No claim or representation is intended for its use in identifying any specific organism or for a specific clinical use (diagnostic, prognostic, therapeutic, or blood banking). It is the user's responsibility to validate the performance of the SX-8G IP-Star for any particular use, since its performance characteristics have not been validated for any specific organism. The SX-8G IP-Star may be used in clinical diagnostic laboratory systems after the laboratory has validated their complete system as required by CLIA '88 regulations in the U.S. or equivalents in other countries.

It is the policy of DIAGENODE to improve products as new techniques and components become available. DIAGENODE reserves the right to change specifications at any time. In an effort to produce useful and appropriate documentation, we appreciate your comments on this publication. Please contact DIAGENODE Technical Services.

General Information

Description

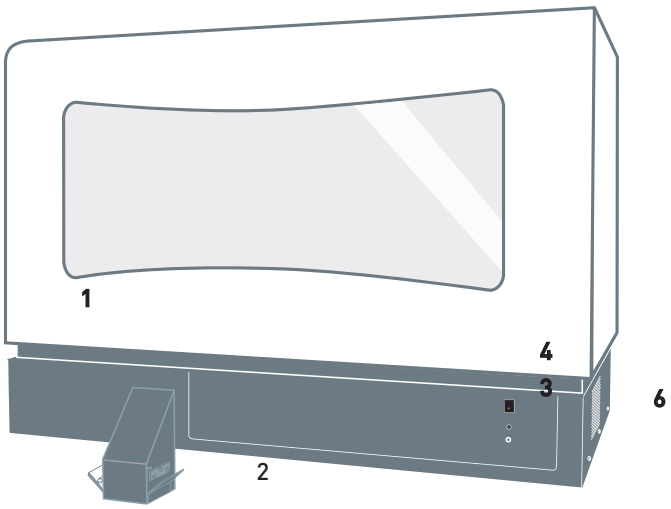
The SX-8G IP-Star workstation is controlled by an external computer and performs fully automated Immunoprecipitation (ChIP / MeDIP,...) using magnetic particles.
The automated steps include for instance:

- Magnetic bead washes
- Binding (Antibody to magnetic beads)
- Immunoselection
- Washing
- Elution
- DNA Purification

The user selects a ChIP/MeDIP protocol in the Software and follows the corresponding instructions to load samples, reagents, and labware onto the worktable of the SX-8G IP-Star. The user then closes the workstation door and starts the protocol. All necessary instructions for carrying out the automated protocol are provided during the run.
The aspiration and dispensing of samples and reagents and the separation of magnetic particles are performed by the 8-channel pipettor head. The temperature of samples may be regulated by 2 Peltier cooling and heating systems during the procedure.

External features

1. Workstation door
2. Waste chute
3. Status LEDs
4. Light switch
5. Personal Computer
6. Connector panel (right side of workstation)



1. Workstation door
The workstation door can be manually opened by the user in order to gain access to the worktable. If the workstation door is open, an interlock activates and prevents movement of the pipettor head.

If executing a protocol under these circumstances, the software will display an error message. To continue, close the workstation door and click the "Retry" button in the software.

2. Waste chute
The waste chute is a metal slide that receives disposable tips ejected from the pipettor head and diverts them into an attached tip waste bag. The waste chute can be removed for cleaning and autoclaving.

Waste tips are automatically discarded into plastic bag that are set on a waste tip slide. Before starting a run, a user has to confirm if the Waste tip slide is set with a plastic bag. Waste tip slide is removable and autoclavable.

3. Status LEDs
There are 2 light-emitting diodes (LEDs) at the front of the SX-8G IP-Star:
- Green LED — indicates that the instrument is receiving power
- Red LED — indicates that an error has occurred

4. Light switch
The light switch is for switching on and off the white light inside the SX-8G IP-Star.

5. Personal Computer

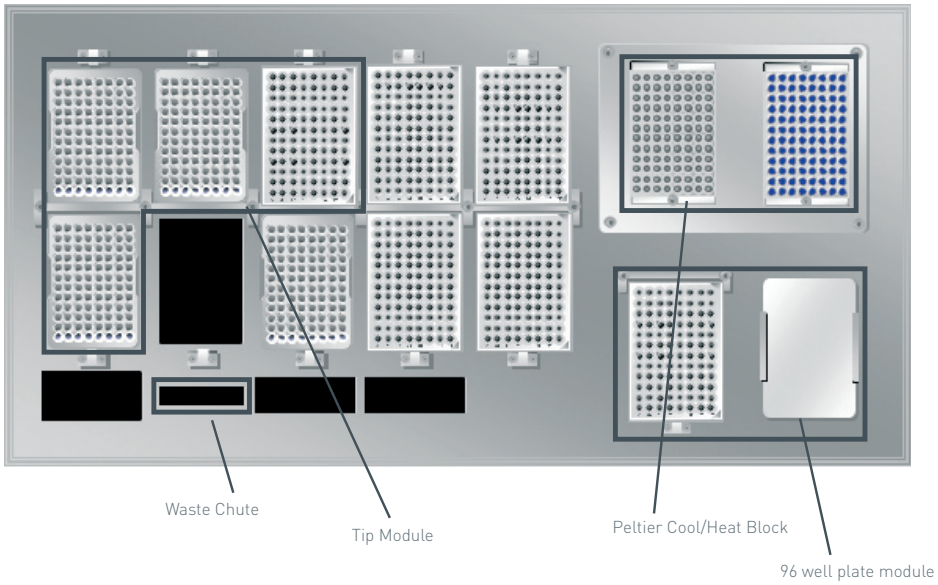
Computer	
User Interface	Graphical User Interface on Windows
Software	SX-8G V52
Computer	AMD ATHLON 5400B (2.8GHz, 512KBX2) Genuine Windows Vista Business Bonus-Windows XP Professional downgrade 1.0GB DDR2 Non-ECC SDRAM, 800MHz, (1DIMM) 80GB SATA, 7200 RPM Hard Drive with Data Burst Cache. 1024 x 768 monitor (65535)

6. Connector panel (right side of workstation)
The connector panel contains the power switch, the socket for the power cord, the fuse box, and the connectors for the computer cables.

Internal Features

Worktable

The worktable contains an array of slots for placing accessories, disposables, samples, and reagents.



Features

- By moving 8 nozzle unit along with X and Y axes, reagent dispensing and treatment are executed.
- On the stage, there will be various kinds of settings of sample, reagent, MTPs racks depend on protocols. 2 Peltier Heat/Cool devices guarantee a perfect temperature control.
- A waste tip slide is placed in the front of instrument.
- The eight nozzle unit can handle 5 to 200 µl reagents per tip.
- All processes are controlled by PC through the software which is based on Windows graphical user interface, to make/change reaction process/protocol freely by user.

Technical specifications	
Instrument	Desktop, 8 nozzles
Throughput	Depending on protocol set by user
Size (mm)	Main Body Approx. 1070 (W) x 650 (D) x 779 (H) mm
Weight	Main Body (130 kg)
Dispensing Volume	5 to 200 µl
Dispensing Precision	5 to 9 µl (Less than 20%) 10 to 19 µl (Less than 5%) 20 to 200 µl (Less than 2%)
Power Supply	AC90 to 240 V, 50/60 Hz
Power Consumption	Maximum 800 VA
Temperature Controller	Two Peltier Blocks (4 to 95°C)
Humidity	< 80% relative humidity at 30°C (86°F) or below
Altitude	Up to 2000 m (6500 ft.)
Place of operation	For indoor use only
Storage temperature	- 40°C to 65°C (-40°F to 149°F)
Pollution level	2 (Normally only non-conductive POLLUTION occurs. Occasionally, however, a temporary conductivity caused by condensation is expected)
Overvoltage category	II
The power lines to the equipment should be voltage regulated and surge protected.	

Installation Procedures

The unpacking and installation of your SX-8G IP-Star is carried out by a DIAGENODE Instrument Service Specialist. A member of your group who is familiar with laboratory and computer equipment should be present during the installation.

Requirements

Site

The SX-8G IP-Star must be located out of direct sunlight, away from heat sources, and away from sources of vibration and electrical interference.
Use a level workbench that is large and strong enough to accommodate the SX-8G IP-Star and the computer hardware. Refer to table "Technical specifications" for the weight, dimensions and other requirements of the SX-8G IP-Star.
No shelves or cupboards should hang above the SX-8G IP-Star, since the height of the instrument increases when the workstation door opens. To ensure that the opened workstation door is above the user's head, the workbench must be at least 80 cm high.

Grounding requirements

To protect operating personnel, the National Electrical Manufacturers' Association (NEMA) recommends that the SX-8G IP-Star is correctly grounded (earthed). The workstation and the computer hardware are equipped with 3-conductor AC power cords that, when connected to appropriate AC power outlets, ground (earth) the equipment.
To preserve this protection feature, do not operate the equipment from AC power outlets that have no ground (earth) connection.

Computer

The operation of the SX-8G IP-Star requires a separate personal computer, which is supplied by DIAGENODE.

SX-8G IP-Star users

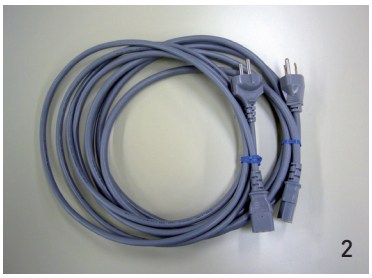
This table covers the general level of competence and training necessary for transportation, installation, use, maintenance, and servicing of the SX-8G IP-Star.
DIAGENODE provides training with the initial installation of the SX-8G IP-Star. For additional training, contact DIAGENODE Technical Services.

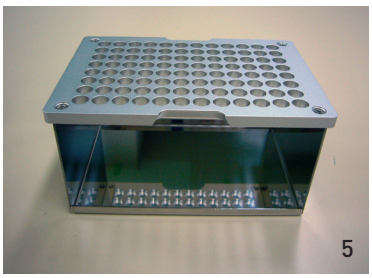
Type of task	Personnel	Training and experience
Transportation	No special requirements	No special requirements
Installation	DIAGENODE Instrument Service Specialists only	
Routine use (running protocols)	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Preventive maintenance	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Servicing and annual preventive maintenance	DIAGENODE Instrument Service Specialists only	

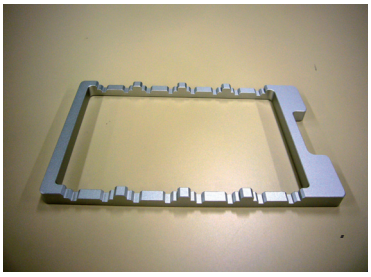
SX-8G IP-Star Content and Consumables

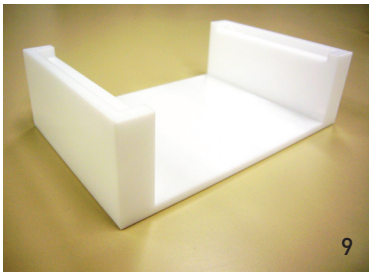
CONTENT	
Description	**Quantity**
SX-8G IP-Star Main body	1
Power cable for 110V	1
Power cable for 240V	1
T-Net communication Board (in PC)	1
T-NET communication cable with PC	1
RS-485 communication Cable	1
Accessories	
Tip racks	4
3x8 Tip rack	4
Reagent Tube Rack	4
Liquid Waste Container	1
Waste Tip Slide	1
Reagent Container Rack	2
Holder for Reagent Container Rack	2
Reagent L supplemental Adapter	4
Adapter for MTP in sample position	1
Disposables	
Tips	500
Maintenance Parts	
O-rings for Tip Connection	16
Silicon Grease bottle for Tip Connection O-rings	1
Computer	
Computer	1
Power cable for 240V (computer)	1
Screen	1
Power cable for 240V (computer)	1

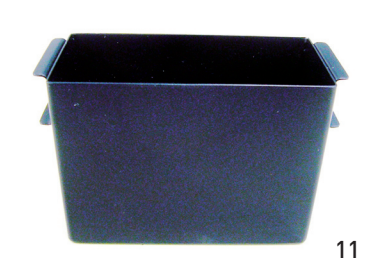
CONSUMABLES		
Description	**Reference**	**Format**
Auto ChIP Kit x16	AB-Auto02-0016	16 rxns
Auto ChIP Kit x100	AB-Auto01-0100	100 rxns
Auto MeDIP Kit x16	AF-Auto01-0016	16 rxns
Auto MeDIP Kit x100	AF-Auto01-0100	100 rxns
Auto MethylCap kit x48	AF-Auto01-0048	48 rxns
200 µl tube strips (12 tubes/strip) + cap strips	WA-001-0080	80 pc
Tips (bulk)	WC-001-1000	1000 pc

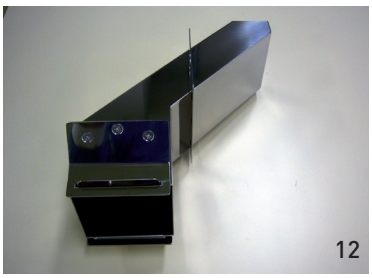


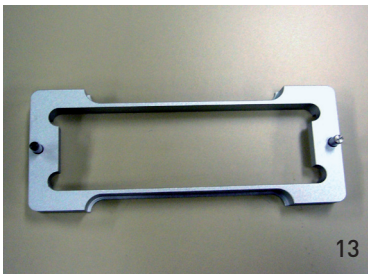


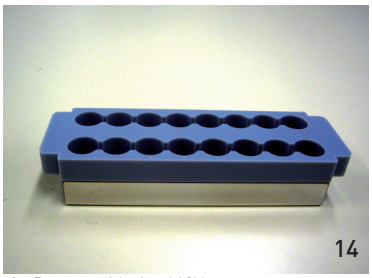


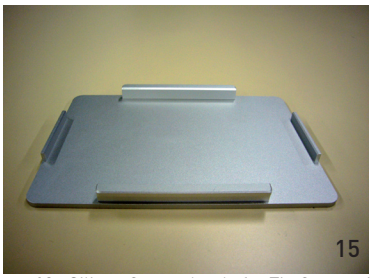


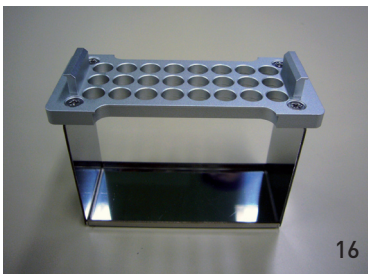












1. Power cable for 110V
2. Power cable for 240V
3. T-NET communication cable with PC
4. RS-485 communication Cable
5. Tip racks
6. Tips
7. Holder for Reagent Container Rack
8. O-rings for Tip Connection
9. Reagent Container Rack
10. Silicon Grease bottle for Tip Connection O-rings
11. Liquid Waste Container
12. Waste Tip Slide
13. Reagent L supplemental Adapter
14. Reagent Tube Rack
15. Adapter for MTP in sample position
16. 3x8 Tip rack

Safety Information

The term **WARNING** or **CAUTION** are used to inform you about circumstances that could result in personal injury to you or other persons OR in damage to the instrument or other equipment.
Details about these situations are given each time the sign is mentioned.

Before using the instrument, it is essential to read this manual carefully. Users should pay particular attention to any advice it contains about hazards that may arise from use of the instrument.
The user's country standard safety requirements are prevailing, which advices given in this manual are intended to supplement and not supersede.

Proper use

WARNING **Risk of personal injury and material damage**

Improper use of the SX-8G IP-Star may cause personal injuries or damage to the instrument. The SX-8G IP-Star should only be operated by qualified personnel who have been appropriately trained. Servicing of the SX-8G IP-Star should only be performed by DIAGENODE Instrument Service Specialists.

Use only DIAGENODE components, otherwise your right to make a claim under the guarantee may be invalidated. Carry out the maintenance regularly in accordance with the operating instructions. DIAGENODE charges for repairs that prove to be required due to incorrect maintenance.

CAUTION **Damage to the instrument**

Avoid spilling water or chemicals onto the SX-8G IP-Star. Instrument damage caused by water or chemical spillage will void your Warranty. In case of an emergency, switch off the SX-8G IP-Star at the power switch on the right side of the instrument and unplug the power cord from the wall poweroutlet.

Electrical safety

To ensure satisfactory and safe operation of the SX-8G IP-Star, it is essential that the line power cord is connected to true electrical earth (ground).

WARNING **Electrical hazard**

Any interruption of the protective conductor (earth/ground lead) inside or outside the instrument or disconnection of the protective conductor terminal is likely to make the instrument dangerous. Intentional interruption is prohibited. Lethal voltages inside the instrument
When the instrument is connected to line power, terminals may be live, and opening covers or removing parts is likely to expose live parts. When working with the SX-8G IP-Star:

- Make sure the line power cord is connected to a line power outlet that has a protective conductor (earth/ground).
- Do not attempt to make any internal adjustments or replacements.
- Do not operate the instrument with any covers or parts removed.
- If water or reagent has spilled inside the instrument, switch off the instrument and disconnect it from the line power supply. Call DIAGENODE Technical Services.
- Servicing should be carried out only by DIAGENODE Instrument Service Specialists.
- If the instrument becomes electrically unsafe for use, make the instrument inoperative and secure it against unauthorized or unintentional operation. Call DIAGENODE

TechnicalServices

The instrument is likely to be electrically unsafe when:

- It shows visible damage
- The line power cord shows signs of damage
- It has been stored under unfavorable conditions for a prolonged period
- It has been subjected to severe transport stresses

WARNING **Risk of electric shock**

The panel on the right side of the SX-8G IP-Star contains connectors for the power cord and the computer cables.
Do not touch this panel with wet hands.

WARNING **Explosive atmosphere**

The SX-8G IP-Star is not designed for use in an explosive atmosphere.
The SX-8G IP-Star will operate correctly under the following conditions:

- Indoors
- Ambient temperature of 15–30°C (59–86°F)
- Ambient relative humidity of ←80% at ←30°C (86°F)

Storage conditions

If you intend to store the instrument for a prolonged period of time, unplug the power cord from the wall power outlet. The instrument can be stored at –40°C to 65°C (–40°F to 149°F).

WARNING **Electrical hazard**

Never install a fuse different from that specified in the user manual.

Biological safety

Specimens and reagents containing materials from humans should be treated as potentially infectious. Use safe laboratory procedures as outlined in publications such as Biosafety in Microbiological and Biomedical Laboratories, HHS (www.cdc.gov/od/ohs/biosfty/biosfty.htm).

Samples

Samples may contain infectious agents. You should be aware of the health hazard presented by such agents and should use, store, and dispose of such samples in accordance with
the required safety regulations.

WARNING **Samples containing infectious agents**

Some samples used with this instrument may contain infectious agents. Handle such samples with the greatest of care and in accordance with the required safety regulations.
Always wear safety glasses, two pairs of gloves, and a lab coat. The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe, and that the instrument operators are suitably trained and not exposed to hazardous levels of infectious agents as defined in the applicable Material Safety Data Sheets (MSDSs) or OSHA, ACGIH, or COSHH documents.
Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.

OSHA: Occupational Safety and Health Administration (United States of America)

ACGIH: American Conference of Government Industrial Hygienists (United States of America)

COSHH: Control of Substances Hazardous to Health (United Kingdom)

Chemicals

WARNING **Hazardous chemicals**

Some chemicals used with this instrument may be hazardous or may become hazardous after completion of the protocol run. Always wear safety glasses, gloves, and a lab coat.
The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe and that the instrument operators are not exposed to hazardous levels of toxic substances (chemical or biological) as defined in the applicable Material Safety Data Sheets (MSDSs) or OSHA, ACGIH, or COSHH documents.
Venting for fumes and disposal of wastes must be in accordance with all national, state, and local health and safety regulations and laws.

OSHA: Occupational Safety and Health Administration (United States of America)
ACGIH: American Conference of Government Industrial Hygienists (United States of America)
COSHH: Control of Substances Hazardous to Health (United Kingdom)

Toxic fumes
If you work with volatile solvents, toxic substances, and so on, you must provide an efficient laboratory ventilation system to remove vapors that may be produced.

Waste disposal

Used labware, such as sample prep plates and disposable tips, may contain hazardous chemicals or infectious agents from the purification process. Such wastes must be collected and disposed of properly in accordance with the local safety regulations.

Mechanical hazards

To protect users, the pipettor head of the SX-8G IP-Star will not move until the workstation door is closed.

WARNING **Moving parts**

To avoid contact with the moving pipettor head during operation of the SX-8G IP-Star, do not insert your hands and fingers through the waste chute at the front of the instrument.
Ventilation inlets are located on both sides of the instrument and contain dust filters. A fan blows out air through ventilation outlets located at the bottom or on the opposite side of the instrument. Another 2 fans blow out air from the worktable through a HEPA® filter.

WARNING **Risk of overheating**

To ensure proper ventilation, maintain a minimum clearance of 5 cm and 15 cm at the rear and left of the SX-8G IP-Star, respectively. Slits and openings which ensure the ventilation of the SX-8G IP-Star must not be covered.

Heat hazard

The right-hand side of the SX-8G IP-Star worktable contains 2 cooling and heating systems.

WARNING **Cooling / Heat hazard**

The temperature of and the cooling and heating system Heating can reach up to 95°C
Hot surface
The cooling and heating systems can reach high temperatures. Avoid touching them when they are hot.

Symbols on the SX-8G IP-Star

WARNING **Location: cooling and heating blocks**

Heat hazard

The temperature of the cooling and heating system can reach up to 95)C.

WARNING **Location: Pipettor head**

Moving part

During instrument operation, the pipettor head may move suddenly.

WARNING **Location: Waste chute**

Biohazard

The waste chute may be contaminated with biohazardous material and must be handled with gloves.

Warranty statement

Your instrument has been carefully tested to ensure optimum operating efficiency and reproducibility of results. DIAGENODE warrants that all new instrumentation manufactured by DIAGENODE will correspond to the product specifications and be free from defects in workmanship and materials for a period of twelve (12) months from the original date of shipment.

Repair or replacement of defective parts will be provided to the purchaser during this time period provided the DIAGENODE instrumentation is operated under conditions of normal and proper use, but not for damage caused by the customer. Worldwide, the maximum time for response to a breakdown is 5 days. If any part or subassembly proves to be defective, it will be repaired or replaced at DIAGENODE's sole option, subsequent to inspection at the factory, or in the field by an authorized factory representative, provided that such defect manifested under normal and proper use. The shipper will pay all transport fees.

Limitation of warranties and remedies

THE FOREGOING WARRANTY IS DIAGENODE'S SOLE AND EXCLUSIVE WARRANTY, AND REPAIR OR REPLACEMENT OF DEFECTIVE PARTS IS THE SOLE AND EXCLUSIVE REMEDY. THERE ARE NO OTHER WARRANTIES OR GUARANTEES, EXPRESS OR IMPLIED. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED, TO THE FULLEST EXTENT PERMITTED BY LAW. (NOTE: SOME STATES DO NOT PERMITD IS CLAIMERS OF IMPLIED WARRANTIES SO THIS LIMITATION MAY NOT APPLY TO YOU). WITH THE EXCEPTION OF THE ABOVE -REFERENCED REPAIR OR REPLACEMENT REMEDY, DIAGENODE'S HALL HAVE NO OB LIGATION OR LIABILITY OF ANY NATURE WHAT SO EVER WITH RESPECT TO THE DIAGENODE INSTRUMENTATION, WHE THER ARISING IN CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO, LIABILITY FOR INDIRECT, CONSEQUENTIAL, INCIDENTAL AND/ OR SPECIAL, PUNITIVE, MULTIPLE AND/ OR EXEMPLARY DAMAGES AND / OR OTHER LOSSES (INCLUDING LOSS OF USE, LOST REVENUES, LOST PROFITS AND DAMAGE TO REPUTATION) , EVEN IF SUCH DAMAGES WERE FORESEEN OR FORSEEABLE, OR WERE BROUGHT TO DIAGENODE'S ATTENTION. IN NO EVENTS HALL DIAGENODE'S LIABILITY TO YOU EXCEED THE PURCHASE PRICE OF THE PRODUCT.

Liability clause

DIAGENODE shall be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own personnel, except in cases where the Company has given its written consent to perform such repairs or modifications.

All materials replaced under this warranty will be warranted only for the duration of the original warranty period, and in no case beyond the original expiration date of original warranty unless authorized in writing by an officer of the Company. Read-out devices, interfacing devices and associated software will be warranted only for the period offered by the original manufacturer of these products.

Representations and warranties made by any person, including representatives of DIAGENODE, which are inconsistent or in conflict with the conditions in this warranty shall not be binding upon the Company unless produced in writing and approved by an officer of DIAGENODE.

Preventive Maintenance

Daily maintenance procedure

WARNING

Hazardous chemicals and infectious agents
The waste contains samples and reagents. This waste may contain toxic or infectious material and must be disposed of properly. Refer to your local safety regulations for proper disposal procedures.

After running the last protocol of the day, perform the daily maintenance procedure:

1. Remove used disposable labware and unwanted samples and reagents, and discard them according to your local safety regulations. If you want to keep any unused reagent, transfer them to airtight containers. Do not store unused lysis buffer, unless otherwise indicated in the kit handbook.

2. If the waste chute contain disposable tips, clean it with 70% ethanol and then with distilled water. Dry the waste chute with paper towels.

3. Check whether the tip guard insert is dirty. If necessary, clean it.

4. Clean the worktable and its accessories with 70% ethanol and then with distilled water. Dry the worktable with paper towels.
   NOTE: Ventilate the worktable for 1 h after cleaning with ethanol.

5. Wipe the other surfaces of the workstation with diluted neutral soap solution, and then with water.

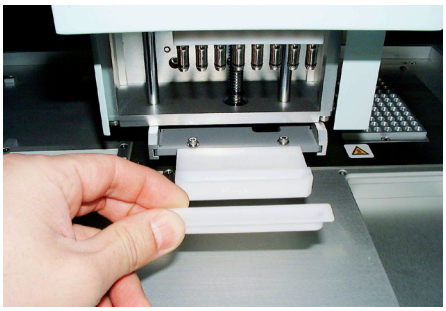
6. Check whether the tip adapters are dirty. If necessary, clean them with distilled water, and then dry them with lint-free paper towels. Avoid contaminating the tip adapters with dust. Do not use ethanol to clean the tip adapters.

7. Remove the tip waste bag from the waste chute. If necessary, remove any disposable tips from the waste chute. Discard the tip waste bag according to your local safety regulations.

Cleaning the tip guard insert
Clean the tip guard insert if it becomes dirty:

1. Switch on the SX-8G IP-Star and open the software.

2. Select "Process/Drop Catcher Cleaning". The pipettor head moves to the front of the worktable, the tip guard moves forward and becomes accessible, and the workstation door unlocks. A dialog box with instructions appears. You will need to remove, clean, and replace the tip guard insert from the Drop Catcher Tray.



3. Close the workstation door and click "OK". The tip guard returns to its resting position and the pipettor head moves to its home position.

Weekly maintenance procedure

Perform the weekly maintenance procedure as follows:

1. Clean the waste chute with 70% ethanol, and then with distilled water. Dry the waste chute with paper towels.

2. Inspect the worktable.

3. Check whether the O-rings are worn-out or damaged. If necessary, replace the O-rings (see procedure B). Grease the O-rings to maintain good contact between tip adapters and disposable tips (see procedure A).

4. Sterilize the interior of the workstation with the UV lamp.
   Sterilization is controlled through one of the windows. UV sterilization does not damage the reusable worktable accessories (e.g., racks), but can damage disposable plastic labware.
   If the worktable contains some tip racks with unused tips, transfer these racks to slots that will allow the tips to be used up in the next protocol. The disposable tips can tolerate one UV treatment.

Procedure A.: Greasing the O-rings

Greasing the O-rings of the pipettor head is required during the weekly maintenance procedure.

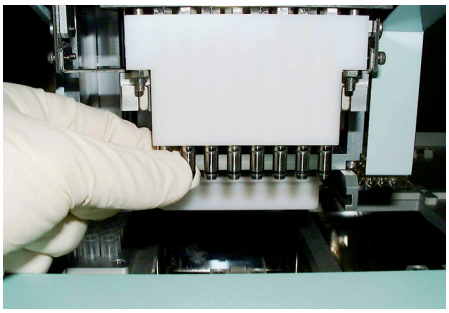
1. Switch on the SX-8G IP-Star and open the software.

2. Select "Process/Greasing O-rings".
   The pipettor head moves to the front of the worktable, the 8 tip adapters move down and become accessible, and the workstation door unlocks.

   A dialog box with instructions appears. You will need to:

   - Open the workstation door
   - Wipe the O-rings aera with a damp cloth
   - Dry the O-rings with tissue
   - Apply silicon grease around each O-ring
   - Remove excess grease with tissue

   Wear gloves while greasing the O-rings.



3. Close the workstation door and click "OK".
   The pipettor head moves to its home position.

Procedure B.: Replace O-rings

Replacement of the O-rings of the pipettor head is required if they look worn-out or damaged during the weekly maintenance procedure.

1. Switch on the SX-8G IP-Star and open the software.

2. Select "Process/Greasing O-rings".
The pipettor head moves to the front of the worktable, the 8 tip adapters move down and become accessible, and the workstation door unlocks.

3. Close the software and switch off the SX-8G IP-Star.

4. Remove the O-ring from each tip adapter using needle-nosed pliers.

5. At the bottom of each tip adapter, wipe clean the groove for the O-ring.

6. Ensure that the new O-rings are not turned inside out (i.e., the O-ring should appear completely flat and not warped).

7. Attach an O-ring at the bottom of a tip adapter.

8. Pull upward the side of the O-ring that is at the back of the tip adapter.

9. Pull forward and upward the side of the O-ring that is at the front of the tip adapter.

10. Check that the O-ring is fitted correctly onto the tip adapter: the inside of the O-ring must be in complete contact with the surface of the tip adapter. If the upper part of the O-ring is bending outward, push it inward using a finger or a spatula.

11. Repeat steps 7 to 10 for the remaining tip adapters.

12. Switch on the SX-8G IP-Star and open the software.

13. Grease the O-rings.

Monthly maintenance procedure

Perform the monthly maintenance procedure as follows:

1. Perform the daily and weekly maintenance procedures.

2. Perform an O-ring leakage test (see below). If necessary, replace the O-rings.

Performing an O-ring leakage test

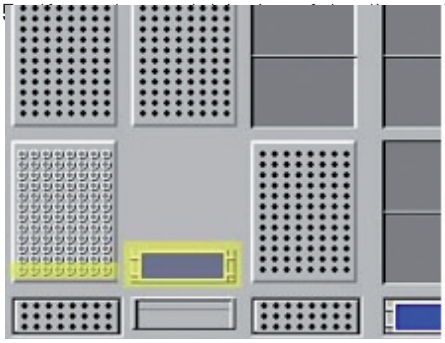
An O-ring leakage test is required during the monthly maintenance procedure.

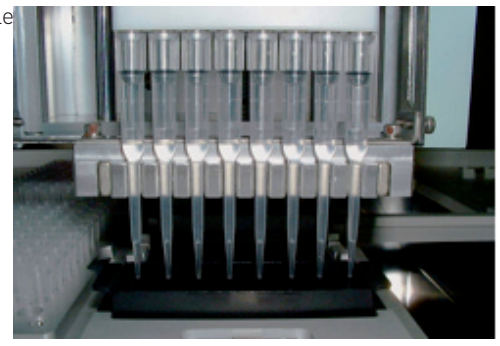
1. Switch on the SX-8G IP-Star and open the software.

2. Select "Process/O-ring Leakage Test".
   A dialog box with instructions appears. You will need to:
   - Open the workstation door
   - Load the worktable according to the dialog box (6 disposable tips and a large reagent container with 10 ml water are required)

3. Close the workstation door and click "OK".
   The pipettor head picks up the tips, aspirates the water, and moves up.
   Another dialog box with instructions appears. You will need to:
   - Open the workstation door
   - Check whether the disposable tips drip within a 10 min period

4. Close the workstation door and click "OK".
   The pipettor head dispenses the water back into the large reagent container and ejects the disposable tips into the tip rack.
   The pipettor head then moves to its home position.





Technical Assistance

At DIAGENODE we pride ourselves on the quality and availability of our technical support. Our Technical Services Departments are staffed by experienced scientists with extensive practical and theoretical expertise in molecular biology and the use of DIAGENODE products. If you have any questions, or experience any difficulties regarding the SX-8G IP-Star or DIAGENODE products in general, do not hesitate to contact us.
DIAGENODE customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at DIAGENODE. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.
For technical assistance and more information call the DIAGENODE Technical Service Department or contact your local distributor...

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CE marking

CE

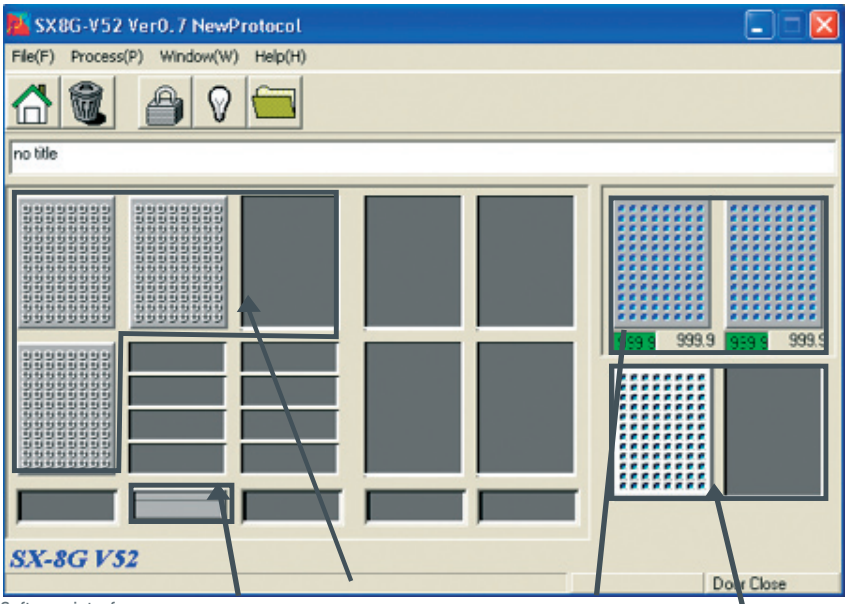
SX-8G IP-Star Software

Start and close SX-8G V52

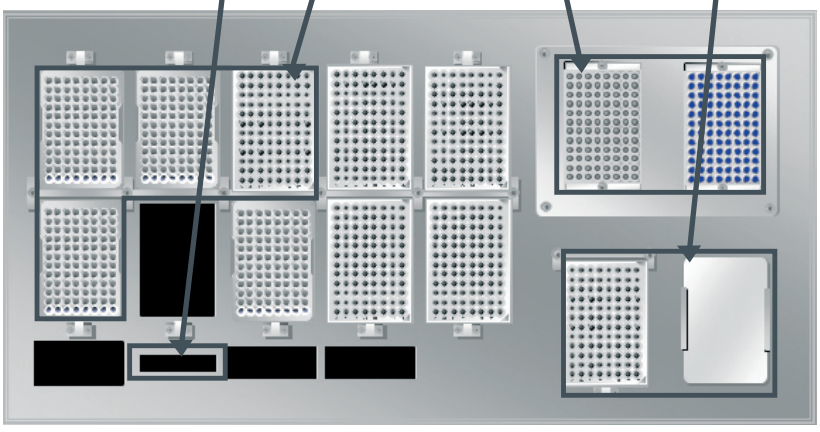
Turn on main switch located on right-front side of robot main body. Turn on the computer to open Windows. On the desktop, click twice the following SX-8G IP-Star icon to open it.
To close the program, select File(F), in the initial window, and click on End.

Description of SX-8G V52 Initial Window

When application is opened, the following initial window appears. The stage layout shown in the center to bottom area is same as the actual robot stage. Using this area, setting positions of reagents, tips and plate can be assigned. Execution, edit and creation of a protocol can also be initiated by clicking the each button.



Software interface
(initial window)



SX-8G IP-Star Workstation

Menu Bar

File(F)

Save as
To store a protocol as new file when a new protocol is made or an existing protocol is changed. Usually, new protocols are saved in the directory SX-8G V52.

Protocol Builder (P)
To make a new protocol or change an existing protocol. When clicked, the protocol builder windows appear. A password is required (only accessible to the software technical support).

Properties
Gives information about protocol properties (sample volume, elution volume, dilution volume and temperature of the blocks).

Easy start protocol
To load a protocol list, select, modify and start a protocol. When clicked, a protocol list contained in the Easy start ini file will be loaded.
Temperature and incubation times for antibody coating and immunoselection steps can be modify under this function.

Process (P)

# of sample / Process single sample
Input total number of samples before execute process SX-8G IP-Star treats 8 samples simultaneously. Therefore a user can set the number of samples from 8 to 8 x n up to 96.

Debug (G)
To test the correct function of new and changed protocols by doing a no real time protocol simulation. It allows testing if the protocol has incorrect steps and to measure time of the different steps.

Information (I)
To indicate contents of selected protocol and step setting information.

Home (H)
The coordinates of all motors are returned to home positions. To use for SX-8G IP-Star to recognize home position when the process execution is stopped by error or emergency. It must not be used during protocol execution. It is same as the return to home position button of tool bar.

Drop Catcher Cleaning
To indicate instruction window when cleaning a drop catcher.

Greasing O-ring
To indicate instruction windows when greasing up O-rings.

O-ring leakage test
To indicate instruction windows when testing of O-ring leakage.

Window (W)

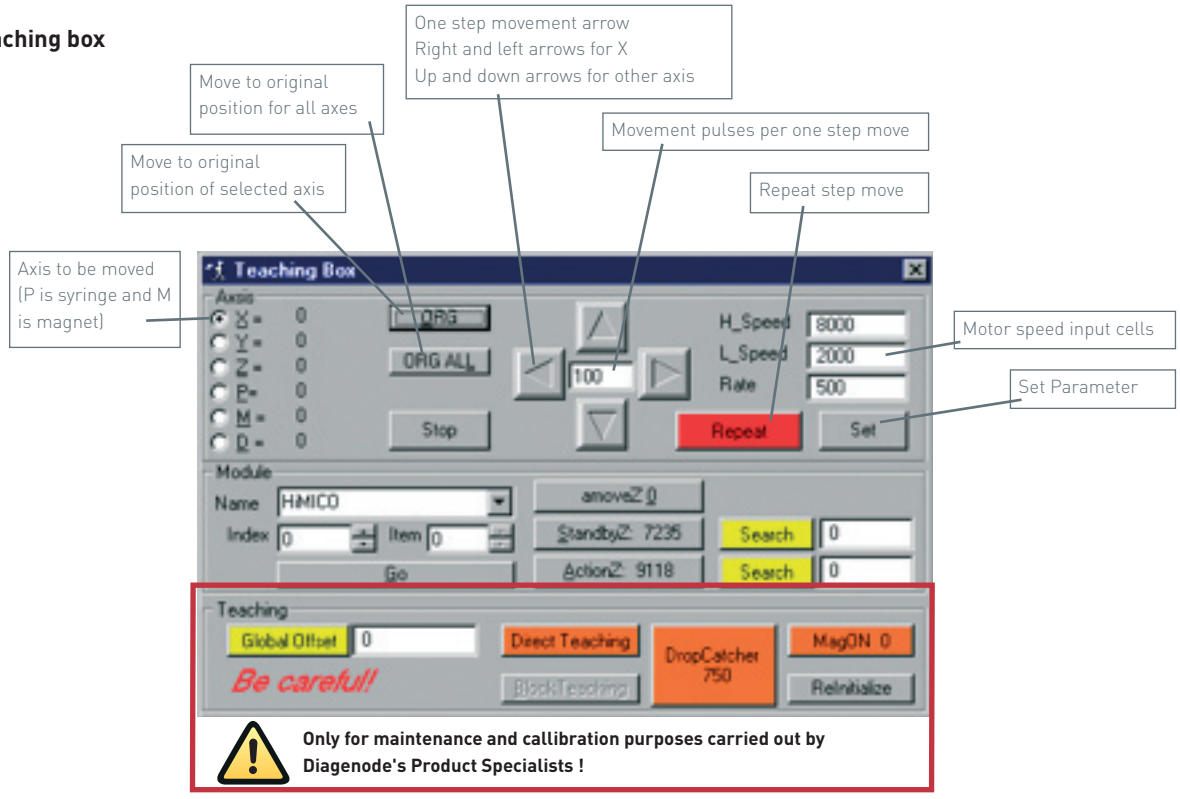
Teaching box
To use manual operation of SX-8G IP Star when needed to check individual movement to resolve mechanical trouble or needed to change pre-set parameter. This function is used for maintenance purpose mainly.

Sensor check
When click it, a sensor table appears to check all sensors. This function is used for maintenance purpose mainly.

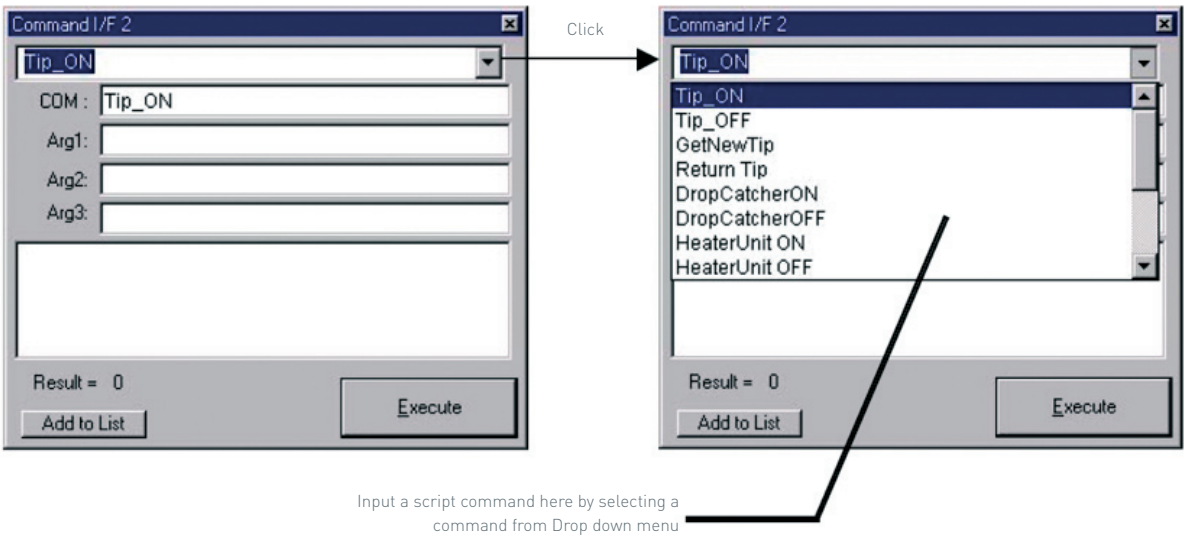
Commander
To move SX-8G IP Star manually by inputting Script commands. This function is used for maintenance purpose mainly.

BIOS Windows
It shows you the error ans system log files.

Teaching box



Commancer



Tool Bar

In the above menus, the following items are in the tool bar for easy to execute. In addition with these buttons, automatic tip discard button is put on the bar for quick resolution of error.

- Move to Home Position (Refer Process (P), Home (H) at menu)
- Discard tips (To discard tips automatically when process is stopped during connecting tips.)
- Solenoid Lock/Unlock button
- UV Lamp On/Off button
- Easy start protocol

Protocol Name

When SX-8G V52 software is opened, the protocol used previously is automatically opened and the name is indicated here. The name is not the name of the file, but the name that users put their preferred name to understand the protocol. If there is no protocol registered, "no title" is indicated. By using this cell, the name can be changed.

Stage Layout and Module Names

At the middle to down position of the initial window, the stage layout of SX-8G V52 is indicated consistent with actual robot stage. When a mouse is moved over each module, the name of each module appears.
The reagents/disposables and sample numbers are set by using this stage. **This setting has to be done before executing protocol.**

SX-8G V52 software has an advantage to be able to make protocols flexibly. In the software, each stage positions have names for the software to recognize where to move. A user needs to understand these names to make protocols.

Module Name	Code
Reagent Tubes (500ul)	REA_S
Reagent Container (M)	REA_M
Reagent Container (L)	REA_L
Tip Rack	NEW_TIP
3 lines Tip rack	TIP3L
Assay plate	ASSAY
Extra Assay Plate	ExAssay
Heat / CoolBlock1	HEAT_BLOCK
Heat / CoolBlock2	COOL_BLOCK
Sample Plate	SAMPLE
Deep Well Plate	DeepWells
Liquid Waste Container	DRAIN
Tip Waste discard Slide	TRASH
Home Position	HOME
(No module)	NULL

Interlocks and temperature Controller Indicators

This robot has an interlock for the door. The door interlock prevents injury by nozzle head action during door open. While this interlock is active (The door is opened.), SX-8G IP-Star cannot execute any movement. The interlock indicator indicates the interlock ON/OFF situation. When it is colored red, the door is opened and when it is green, it is closed to be able to execute protocols. The temperature controller indicators indicate if the actual temperatures are within 1 degree C comparing to setting temperatures. If it is not, the color is red and if it is within 1 degree C, the color is green.

Setting of Disposables

Reagent Containers

There are 3 sizes of reagent containers/rack: Large (35ml for 8 nozzles, permanent type), Middle (10ml for 8 nozzles) and Small (500 µl tubes for 1 nozzle per one tube). In order to set reagent container Small, there are racks to hold 2x8 small tubes. The container (M) has fins of different length at right and left sides to insert stage with correct direction.

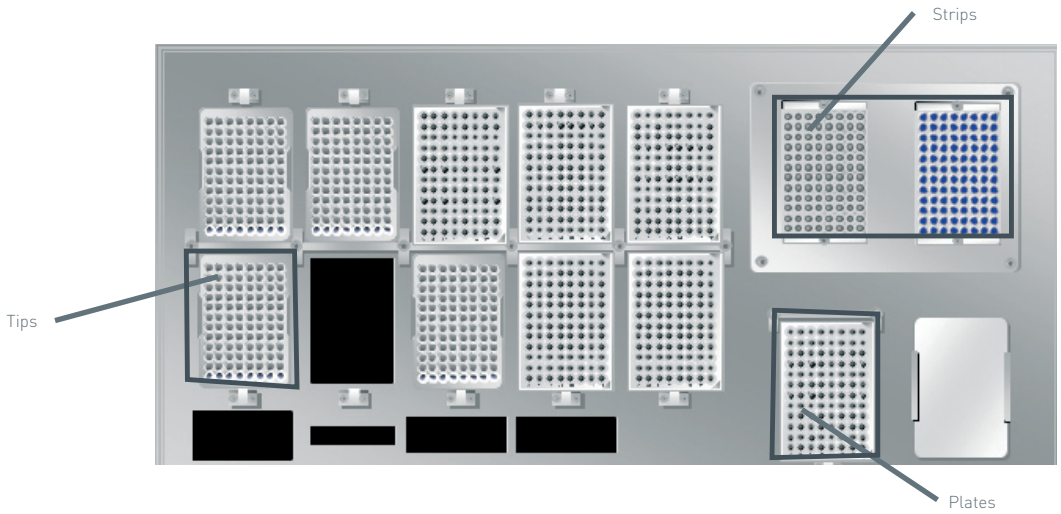
Tips

DIAGENODE original tips have to be used to achieve the best performance. Up to 4 racks for 8 x 12 (96 tips) and also up to 3 racks for 8 x 3 (24 tips) can be set. Unless specially assigned for a certain purpose on a protocol, SX-8G IP-Star always starts using tips from Tip Module 1 (see hereafter).

Plates (MTPs and 2 PCR plates)

V, flat or U bottom plates are set on the pre-assigned positions of stage. PCR plates or tube strips can be set on the Heat/Cool blocks.

There is a stainless steel Tip Slide for waste tips. Every run, a plastic bag should be changed to a new one.



Troubleshooting

Refer to this section if you encounter problems while operating the SX-8G SX-8G IP-Star.

General troubleshooting

Error Cause	Remedy
SX-8G IP-Star cannot be switched on	SX-8G IP-Star is not receiving power. Check that the power cord is connected to the workstation and to the wall power outlet.
Computer cannot be switched on	Computer is not receiving power. Check that the power cord is connected to the computer and to the wall power outlet.
SX-8G IP-Star shows no movement when a protocol is started	SX-8G IP-Star is not switched on. Check that the SX-8G IP-Star is switched on.
SX-8G IP-Star shows abnormal movement when a protocol is started	The pipettor head may have lost its home position. In the Software, select "Manual Operation/ Home". After confirming that the pipettor head moves to the home position, run the protocol again.
Aspirated liquid drips from the disposable tips	Dripping is acceptable when ethanol is being handled. For other liquids: air is leaking from the syringe pumps. Grease or replace the O-rings. If the problem persists, contact DIAGENODE Technical Services.

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